

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-3 (Cancelled).

Claim 4 (Previously Presented): The process as claimed in Claim 36, wherein at least one organofunctional group(s) of the silicon compound A is a linear, branched or cyclic alkyl group having from 1 to 20 carbon atoms and may optionally be substituted with a halogen or an alkenyl group having from 2 to 16 carbon atoms.

Claim 5 (Previously Presented): The process as claimed in Claim 36, wherein at least one organofunctional group(s) of silicon compound A is reacted with the surface of the organofunctional substrate by the addition of the acid or base in the presence of a solvent, or by the addition of the acid or base in the presence of at least one free radical generator, or by the addition of the acid or base in the presence of a solvent and of at least one free radical generator.

Claim 6 (Currently Amended): The process as claimed in Claim 5, which comprises the addition of an acid selected from the group consisting of HCl, HNO₃, HCOOH, ~~CH₃OOH~~ CH₃COOH, H₃PO₄, and H₂SO₄.

Claim 7 (Currently Amended): The process as claimed in Claim 5, wherein said free radical generator is selected from the group consisting of di-tert-butyl peroxide, dicumyl peroxide, ~~or~~ and di-benzoyl peroxide.

Claim 8 (Previously Presented): The process as claimed in Claim 36, wherein a method used to apply the silicon compound B is spraying, dipping, drenching, brushing, polishing, rolling, doctoring, CVD, or PVD.

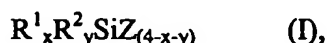
Claim 9 (Previously Presented): The process as claimed in Claim 36, further comprising heat treating the organofunctional substrate after reacting the organofunctional group of the silicon compound A with the surface of the organofunctional substrate, after applying the organofunctional silicon compound B to the polar treated surface or both.

Claim 10 (Previously Presented): The process as claimed in Claim 36, wherein the organofunctional substrate is heat treated from 80 to 120°C for from 0.5 to 2 hours after reacting the organofunctional group of the silicon compound A with the surface of the organofunctional substrate.

Claim 11 (Previously Presented): The process as claimed in Claim 36, wherein the organofunctional substrate is heated from 100 to 200°C for from 0.5 to 2 hours after applying the organofunctional silicon compound B to the polar treated surface.

Claim 12 (Previously Presented): The process as claimed in Claim 36, further comprising precleaning the organofunctional substrate by treating said organofunctional substrate with at least one acidic aqueous solution, basic aqueous solution, acid alcoholic solution or basic alcoholic solution.

Claim 13 (Currently Amended): The process as claimed in Claim 36, wherein one or both of the silicon compounds A and B is an organosilane of the general formula I:



wherein the groups R^1 and R^2 are identical or different, and each is at least one linear, branched, or cyclic alkyl group having from 1 to 20 carbon atoms, ω -chloroalkyl, ω -bromoalkyl, ω -iodoalkyl, ω -azidoalkyl, ω -cyanoalkyl, ω -cyanatoalkyl, ω -isocyanatoalkyl, fluoroalkyl, perfluoroalkyl, alkenyl, aryl, ω -acryloxyalkyl, ω -methacryloxy alkyl, sulfane, ω -mercaptoalkyl, sulfoxyalkyl, ω -thiocyanatoalkyl, ω -glycidylloxyalkyl, epoxy alkyl, alkenyloxyalkyl, alkoxyalkyl, hydroxyalkyl, aminoalkyl, carbonatoalkyl or a ureidoalkyl group, where each alkyl or alkenyl group contains from 1 to 6 carbon atoms,

Z is a chloro, a methoxy, ethoxy, isopropoxy, 2-methoxyethoxy or acetoxy group, and

for compound A, $2 \leq (x + y) \leq 3$ and for compound B, $1 \leq (x + y) \leq 3$;

~~x is 1, 2, or 3, and~~

~~y is 0, 1, or 2, and (x+y) ≤ 3 ;~~

or an organosiloxane based on at least one organosilane of the general formula I.

Claim 14 (Previously Presented): The process as claimed in Claim 36, wherein one or both of silicon compounds A and B is present in monomeric, oligomeric, cocondensed, dissolved, emulsified, or suspended form.

Claim 15 (Previously Presented): The process as claimed in Claim 36, wherein the organofunctional substrate comprises a plastic, a fiber or a natural substance.

Claim 16 (Previously Presented): The process as claimed in Claim 36, wherein the organofunctional substrate is selected from the group consisting of polyethylene, polypropylene, polyamide, polyester, polyacrylate, polyurethane, polystyrene, polycarbonate, polyvinyl chloride, polyethylene terephthalate, silicone, melamine resin, carbon fiber, furan resin, alkyd resin, bismaleimidetriazine resin, ethylene-vinyl acetate copolymer, acrylonitrile-butadiene-styrene copolymer, wood and rubber.

Claim 17 (Cancelled)

Claim 18 (Previously Presented): A product comprising a surface-modified substrate produced by the process as claimed in Claim 36.

Claim 19 (Previously Presented): A process for repelling water, oil, dirt, dust, paint, microorganisms or bacteria comprising incorporating a substrate obtained by the process as claimed in Claim 36 as a coating on an article.

Claim 20 (Currently Amended): A process for modifying the surface of an organofunctional substrate comprising:

reacting an organofunctional group of a silicon compound A with the surface of an organofunctional substrate to form a polar treated surface, wherein the silicon compound A comprises at least one organofunctional group and at least one chloro, alkoxy, carboxy or hydroxyl group, and further wherein said silicon compound A may react to form a polymer bearing silyl groups, then

applying to the polar treated surface an organofunctional silicon compound B, wherein the silicon compounds A and B may be identical or different, the silicon compound B bears at least one chloro, alkoxy, carboxy or hydroxyl group, and the silicon compound B reacts with the polar treated surface,

wherein the organofunctional group of silicon compound A is reacted with the surface of the organofunctional substrate by the addition of an acid or base and in the presence of a free radical generator or a free radical generator, or both, and a solvent, and

wherein the acid or base is selected from the group consisting of HCl, HNO₃, HCOOH, CH₃COOH, H₃PO₄, H₂SO₄, an amine, Na₂CO₃, ~~NaOH~~ NaOH, NH₄Cl, CH₃COONa, and CH₃COONH₄.

Claim 21 (Previously Presented): The process as claimed in Claim 20, wherein the organofunctional group of the silicon compound A is a linear, branched or cyclic alkyl group having from 1 to 20 carbon atoms and may optionally be substituted with a halogen or an alkenyl group having from 2 to 16 carbon atoms.

Claim 22 (Previously Presented): The process as claimed in Claim 20, which comprises addition of an acid selected from the group consisting of HCl, HNO₃, HCOOH, CH₃COOH, H₃PO₄, and H₂SO₄.

Claim 23 (Currently Amended): The process as claimed in Claim 20, wherein said free radical generator is selected from the group consisting of di-tert-butyl peroxide, dicumyl peroxide, ~~or~~ and di-benzoyl peroxide.

Claim 24 (Currently Amended): The process as claimed in Claim 20, wherein a ~~method used to apply the~~ silicon compound B is applied by spraying, dipping, drenching, brushing, polishing, rolling, doctoring, chemical vapor deposition (CVD) or physical vapor deposition (PVD).

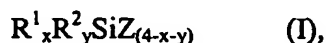
Claim 25 (Previously Presented): The process as claimed in Claim 20, further comprising heat treating the organofunctional substrate after reacting the organofunctional group of the silicon compound A with the surface of the organofunctional substrate, after applying the organofunctional silicon compound B to the polar treated surface or both.

Claim 26 (Previously Presented): The process as claimed in Claim 20, wherein the organofunctional substrate is heat treated from 80 to 120°C for from 0.5 to 2 hours after reacting the organofunctional group of the silicon compound A with the surface of the organofunctional substrate.

Claim 27 (Previously Presented): The process as claimed in Claim 20, wherein the organofunctional substrate is heated from 100 to 200°C for from 0.5 to 2 hours after applying the organofunctional silicon compound B to the polar treated surface.

Claim 28 (Previously Presented): The process as claimed in Claim 20, further comprising precleaning the organofunctional substrate by treating said organofunctional substrate with at least one acidic aqueous solution, basic aqueous solution, acid alcoholic solution or basic alcoholic solution.

Claim 29 (Currently Amended): The process as claimed in Claim 20, wherein one or both of the silicon compounds A and B is an organosilane of the general formula I



wherein the groups R^1 and R^2 are identical or different, and each is at least one linear, branched, or cyclic alkyl group having from 1 to 20 carbon atoms, a ω -chloroalkyl, ω -bromoalkyl, ω -iodoalkyl, ω -azidoalkyl, ω -cyanoalkyl, ω -cyanatoalkyl, ω -isocyanatoalkyl, fluoroalkyl, perfluoroalkyl, alkenyl, aryl, ω -acryloxyalkyl, ω -methacryloxy alkyl, sulfane, ω -mercaptoalkyl, sulfoxyalkyl, ω -thiocyanatoalkyl, ω -glycidyoxyalkyl, epoxy alkyl, alkenyloxyalkyl, alkoxyalkyl, hydroxyalkyl, aminoalkyl, carbonatoalkyl, ureidoalkyl group, where each alkyl group contains from 1 to 6 carbon atoms, Z is a chloro, a methoxy, ethoxy, isopropoxy, 2-methoxyethoxy or acetoxy group, and

x is 1, 2, or 3; and

y is 0, 1, or 2, ~~and $(x+y) \leq 3$,~~

for compound A, $1 \leq (x+y) \leq 3$ and for compound B, $(x+y) \leq 3$;

or an organosiloxane based on at least one organosilane of the general formula I.

Claim 30 (Previously Presented): The process as claimed in Claim 20, wherein one or both of silicon compounds A and B is present in monomeric, oligomeric, cocondensed, dissolved, emulsified, or suspended form.

Claim 31 (Previously Presented): The process as claimed in Claim 20, wherein the organofunctional substrate comprises a plastic, a fiber or a natural substance.

Claim 32 (Previously Presented): The process as claimed in Claim 20, wherein the organofunctional substrate is selected from the group consisting of polyethylene, polypropylene, polyamide, polyester, polyacrylate, polyurethane, polystyrene, polycarbonate, polyvinyl chloride, polyethylene terephthalate, silicone, melamine resin, carbon fiber, furan resin, alkyd resin, bismaleimidetriazine resin, ethylene-vinyl acetate copolymer, acrylonitrile-butadiene-styrene copolymer, wood and rubber.

Claims 33-35 (Canceled).

Claim 36 (Currently Amended): A process for modifying the surface of an organofunctional substrate comprising:

a) applying a silicon compound A to the surface of an organofunctional substrate, wherein said silicon compound A comprises at least two organofunctional groups, and comprises at least one hydrolyzable group selected from the group consisting of chloro, alkoxy, carboxy, and hydroxyl; wherein at least one of the organofunctional groups is capable of undergoing a crosslinking reaction upon exposure to UV radiation, and wherein the silicon compound A is capable of forming a polymer bearing a silyl group,

b) reacting an organofunctional group of the silicon compound A with the surface an organofunctional substrate to form a polar treated surface,

c) exposing the polar treated surface to UV radiation to initiate crosslinking between the at least one of the organofunctional groups of the silicon compound A capable of undergoing a crosslinking reaction upon exposure to UV radiation,

d) applying a silicon compound B to the polar treated surface, said silicon compound B comprising at least one organofunctional group and at least one hydrolyzable group

selected from the group consisting of chloro, alkoxy, carboxy, and hydroxyl; wherein the silicon compound B may be the same or different from the silicon compound A,

e) reacting the silicon compound B with the polar treated surface,

wherein the organofunctional group of silicon compound A is reacted with the surface of the organofunctional substrate by the addition of an acid or base in the presence of a solvent or in the presence of a free radical generator, or both, and

wherein said acid or base is selected from the group consisting of HCl, HNO₃, HCOOH, ~~CH₃OOH~~ CH₃COOH, H₃PO₄, H₂SO₄, an amine, Na₂CO₃, ~~NaOH~~ NaOH, NH₄Cl, CH₃COONa, and CH₃COONH₄.

Claim 37 (Previously Presented): The process of Claim 36, wherein said silicon compound A comprises at least one hydrolyzable group which is chloro.

Claim 38 (Previously Presented): The process of Claim 36, wherein said silicon compound A comprises at least one hydrolyzable group which is alkoxy.

Claim 39 (Previously Presented): The process of Claim 36, wherein said silicon compound A comprises at least one hydrolyzable group which is carboxy.

Claim 40 (Previously Presented): The process of Claim 36, wherein said silicon compound A comprises at least one hydrolyzable group which is hydroxyl.

Claim 41 (Previously Presented): The process of Claim 36, wherein said silicon compound B comprises at least one hydrolyzable group which is chloro.

Claim 42 (Previously Presented): The process of Claim 36, wherein said silicon compound B comprises at least one hydrolyzable group which is alkoxy.

Claim 43 (Previously Presented): The process of Claim 36, wherein said silicon compound B comprises at least one hydrolyzable group which is carboxy.

Claim 44 (Previously Presented): The process of Claim 36, wherein said silicon compound B comprises at least one hydrolyzable group which is hydroxyl.

Claim 45 (Previously Presented): The process of Claim 36, wherein said silicon compound A and said silicon compound B are the same.

Claim 46 (Previously Presented): The process of Claim 36, wherein said silicon compound A and said silicon compound B are different.

Claims 47-49 (Cancelled)

Claim 50 (Currently Amended): The process as claimed in Claim 5, which comprises the addition of a base selected from the group consisting of an amine, Na_2CO_3 , ~~NaOH~~ NaOH, NH_4Cl , CH_3COONa , and $\text{CH}_3\text{COONH}_4$.

U.S. Application No.: 10/035,168
Reply to Office Action of December 28, 2004

Claim 51 (Currently Amended): The process as claimed in Claim 20, which comprises addition of a base selected from the group consisting of an amine, Na_2CO_3 , ~~NaOH~~ NaOH , NH_4Cl , CH_3COONa , and $\text{CH}_3\text{COONH}_4$.